



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,802	10/01/2001	Tsutomu Nishiuvatoko	35.C15849	3422

5514 7590 05/22/2003

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

[REDACTED] EXAMINER

GRAINGER, QUANA MASHELL

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2852

DATE MAILED: 05/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/965,802	Nishiawatko
Examiner	Group Art Unit
Q. GRAINGER	2852

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- Responsive to communication(s) filed on _____.
- This action is FINAL.
- Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

- Claim(s) 1-2, 4-8, 10-14, + 16-38 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- Claim(s) _____ is/are allowed.
- Claim(s) 1-2, 4-8, 10-14, + 16-38 is/are rejected.
- Claim(s) _____ is/are objected to.
- Claim(s) _____ are subject to restriction or election requirement

Application Papers

- The proposed drawing correction, filed on _____ is approved disapproved.
- The drawing(s) filed on _____ is/are objected to by the Examiner
- The specification is objected to by the Examiner.
- The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- All Some* None of the:
- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. _____.
- Copies of the certified copies of the priority documents have been received
in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____.

Attachment(s)

- Information Disclosure Statement(s), PTO-1449, Paper No(s). _____ Interview Summary, PTO-413
- Notice of Reference(s) Cited, PTO-892 Notice of Informal Patent Application, PTO-152
- Notice of Draftsperson's Patent Drawing Review, PTO-948 Other _____

Office Action Summary

Serial Number: 09/965802
Art Unit: 2852

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-2, 4-8, 10-14, and 16-38 are rejected under 35 U.S.C. 102(b) as being anticipated by Noda et al. in view of Kitamura. The process cartridge detachably mountable to a main body of an electrophotographic image forming apparatus for forming an image on a

Serial Number: 09/965802

Art Unit: 2852

recording medium, the main body having a twisted hole of which a cross-section has a plurality of comers by Noda et al. comprises an electrophotographic photosensitive drum 7; a developing roller 9 for developing an electrostatic latent image formed on said electrophotographic photosensitive drum; and a driving-force transmitting part provided on one lengthwise end of said electrophotographic photosensitive drum, and having a twisted protrusion 37a to be fitted in said hole, a cross-section of the twisted protrusion having a plurality of comers, a shaft 37 portion supported by a bearing portion 38, and a gear portion 7b for transmitting a driving force to said developing roller, said shaft portion 37 and said gear portion 7b overlapping each other in an axial direction of said electrophotographic photosensitive drum, wherein when said hole is rotated with said protrusion fitted in said hole when said process cartridge is mounted to said main body of the apparatus, a rotational force of said hole is transmitted to said electrophotographic photosensitive drum through said protrusion. The driving-force transmitting part further has a coupling portion 14 fitted and fixed to one end of the drum cylinder of said photosensitive drum, and said coupling portion, said gear portion, a shaft portion having an overlap with said gear portion, and said protrusion provided on an end surface of said shaft portion are disposed in said axial direction in the named order, and said coupling portion, said gear portion, said shaft portion having the overlap with said gear portion, said protrusion are formed into one united body. The process cartridge wherein a through-hole is formed through said coupling portion, said gear portion, said shaft portion having the overlap with said gear portion, and said protrusion, an earth pin is provided in said through-hole, said earth pin is

Serial Number: 09/965802
Art Unit: 2852

provided on the inner end surface of said driving-force transmitting part, and is in contact with an earth plate which is in contact with the inner surface of said drum cylinder, whereby when said process cartridge is mounted to said main body of the apparatus, said earth pin comes into contact with a main body earth contact provided in said hole, and said electrophotographic photosensitive drum is electrically earthed to said main body of the apparatus. A portion of said shaft portion is surrounded by said gear portion. The cross-section of said hole is a substantially equilateral triangle, and the cross-section of said protrusion is a substantially equilateral triangle. Noda et al. teaches an electrophotographic photosensitive drum used in an electrophotographic image forming apparatus for forming an image on a recording medium, the electrophotographic image forming apparatus having a twisted hole of which a cross-section has a plurality of comers, said electrophotographic photosensitive drum comprising: a drum cylinder having a photosensitive layer on a peripheral surface thereof, and a driving-force transmitting part mounted on one end of said drum cylinder, and having a twisted protrusion to be fitted in said hole, a cross-section of said twisted protrusion having a plurality of comers, a shaft portion supported by a bearing portion, and a gear portion for transmitting a driving force to a developing roller, said shaft portion and said gear portion overlapping each other in an axial direction of said electrophotographic photosensitive drum, wherein when said hole is rotated with said protrusion fitted in said hole when said photosensitive drum is mounted to a main body of said apparatus, a driving force for rotating said electrophotographic photosensitive drum is received from the main body of said apparatus. The driving-force transmitting part further has a

Serial Number: 09/965802

Art Unit: 2852

coupling portion fitted and fixed to one end of the drum cylinder of said photosensitive drum, and said coupling portion, said gear portion, a shaft portion having an overlap with said gear portion, and said protrusion provided on an end surface of said shaft portion are disposed in said axial direction in the named order, and said coupling portion, said gear portion, said shaft portion having the overlap with said gear portion, and said protrusion are formed into one united body.

Noda et al. does not teach driving-force transmitting part further has a second gear portion in said axial direction between said coupling portion and a fixed portion, and said second gear portion transmits the driving force to a transfer roller provided in said main body of the apparatus.

Kitamura teaches a driving-force transmitting part further has a second gear portion in said axial direction between said coupling portion and a fixed portion, and said second gear portion transmits the driving force to a transfer roller provided in said main body of the apparatus (column 4, lines 35-47).

Noda et al. in view of Kitamura suggest a driving-force transmitting part for the developing roller since it is a rotating roller in the apparatus and there is also a driving-force transmitting part that has a second gear portion that transmits the driving force to a transfer roller provided in said main body of the apparatus. a through-hole is formed through said coupling portion, said gear portion, said shaft portion having the overlap with said gear portion, and said protrusion, an earth pin 119a is provided in said through-hole, said earth pin is provided on the inner end surface of said driving-force transmitting part, and is in contact with an earth plate 118

Serial Number: 09/965802
Art Unit: 2852

which is in contact with the inner surface of said drum cylinder, whereby when said electrophotographic photosensitive drum is mounted to said main body of the apparatus, said earth pin comes into contact with a main body earth contact provided in said hole, and said electrophotographic photosensitive drum is electrically earthed to said body of the apparatus. A portion of said shaft portion is surrounded by said gear portion. The cross-section of said hole is a substantially equilateral triangle, and the cross-section of said protrusion is a substantially equilateral triangle.

Noda et al. in view of Kitamura suggest a driving-force transmitting part mounted on one end of an electrophotographic photosensitive drum used in a process cartridge detachably mountable to a main body of an electrophotographic image forming apparatus for forming an image on a recording medium, the electrophotographic image forming apparatus having a twisted hole of which a cross-section has a plurality of comers, said driving-force transmitting part comprising: a twisted protrusion to be fitted into said hole when said process cartridge is mounted to said main body of the apparatus, a cross-section of said twisted protrusion having a plurality of comers; a shaft portion supported by a bearing portion when said driving-force transmitting part is mounted in said process cartridge; and a gear portion for transmitting a driving force to a developing roller, said shaft portion and said gear portion overlapping each other in an axial direction of said electrophotographic photosensitive drum, wherein when said hole is rotated with said protrusion fitted in said hole when said process cartridge is mounted to said main body of the apparatus, the rotational force of said hole receives a driving force for

Serial Number: 09/965802
Art Unit: 2852

rotating said electrophotographic photosensitive drum from said main body of the apparatus through said protrusion.

The driving-force transmitting part further comprising a coupling portion fitted and fixed to one end of the drum cylinder of said photosensitive drum, wherein said coupling portion, said gear portion, a shaft portion having an overlap with said gear portion, and said protrusion provided on an end surface of said shaft portion are disposed in said axial direction in the named order, and said coupling portion, said gear portion, said shaft portion having the overlap with said gear portion, and said protrusion are formed into one united body. A through-hole is formed through said coupling portion, said gear portion, said shaft portion having the overlap with said gear portion, and said protrusion, an earth pin is provided in said through-hole, said earth pin is provided on the inner end surface of said driving-force transmitting part, and is in contact with an earth plate which is in contact with the inner surface of said drum cylinder, whereby when said process cartridge is mounted to said main body of the apparatus, said earth pin comes into contact with a main body earth contact provided in said hole, and said electrophotographic photosensitive drum is electrically earthed to said main body of the apparatus. The cross-section of said hole is a substantially equilateral triangle, and the cross-section of said protrusion is a substantially equilateral triangle.

Noda et al. in view of Kitamura suggest an electrophotographic image forming apparatus to which a process cartridge is detachably mountable for forming an image on a recording medium, comprising: (a) a twisted hole of which a cross-section has a plurality of comers; and

Serial Number: 09/965802
Art Unit: 2852

(b) a mounting portion for detachably mounting the process cartridge, the process cartridge having: an electrophotographic photosensitive drum; a developing roller for developing an electrostatic latent image formed on said electrophotographic photosensitive drum; a driving-force transmitting part provided on lengthwise one end of said electrophotographic photosensitive drum, and having a twisted protrusion to be fitted in said hole, a cross-section of the twisted protrusion having a plurality of comers, a shaft portion supported by a bearing portion, and a gear portion for transmitting a driving force to said developing roller, said shaft portion and said gear portion overlapping each other in an axial direction of said electrophotographic photosensitive drum, wherein when said hole is rotated with said protrusion fitted in said hole when said process cartridge is mounted to the main body of said apparatus, the rotation of said hole is transmitted to said electrophotographic photosensitive drum through said protrusion.

Noda et al. in view of Kitamura suggest an electrophotographic photosensitive drum for use in a process cartridge detachably mountable to a main body of an electrophotographic image forming apparatus for forming an image on a recording medium, the main body having a motor, an apparatus main body gear for transmitting a driving force of said motor, and a non-circular twisted hole rotated with said apparatus main body gear, a cross-section of the twisted hole having a plurality of comers, said electrophotographic photosensitive drum comprising: (a) a cylinder having a photosensitive layer on the peripheral surface thereof, and (b) a driving-force transmitting part mounted on one end of said cylinder, and the driving-force transmitting part

Serial Number: 09/965802

Art Unit: 2852

having a spur gear for transmitting a driving force received from said main body of the apparatus to a transfer roller provided in said main body of the apparatus when said process cartridge is mounted to said main body of the apparatus, a helical gear provided in Juxtaposed relationship with said spur gear for transmitting the driving force received from said main body of the apparatus to a developing roller provided in said process cartridge when said process cartridge is mounted to said main body of the apparatus, a shaft portion provided in juxtaposed relationship with said helical gear, and rotatably supported by a bearing portion when said photosensitive drum is mounted in said process cartridge, and a non-circular twisted protrusion fitted into said hole provided in said main body of the apparatus, to receive the transmission of the driving force from said main body of the apparatus and of which the cross-section has a plurality of comers, wherein when said photosensitive drum is mounted in said process cartridge, said shaft portion has an area overlapping an area in which said helical gear is provided, and the driving force received from said main body of the apparatus through said hole and said protrusion is transmitted to said cylinder through said helical gear and said spur gear, and is transmitted to said developing roller through said helical gear, and is transmitted to said transfer roller through said spur gear.

On the end surface of said helical gear, a circular recess is provided on a line coaxial with said axis, and said bearing portion slides with the outer peripheral surface of said shaft portion and the inner peripheral surface of said recess which is continuous from said outer peripheral surface, and rotatably supports said shaft portion and said recess. The electrophotographic

Serial Number: 09/965802

Art Unit: 2852

photosensitive drum further comprising an earth member for grounding said photosensitive drum to said main body of the apparatus when said process cartridge is mounted to said main body of the apparatus, said earth member being provided at the center of said driving-force transmitting part through the same in said axial direction. The driving-force transmitting part is one united body made of resin into which a fitted portion fitted to one end of said cylinder, said spur gear, said helical gear and said protrusion are formed integrally. The tooth width of said spur gear is narrower than the tooth width of said helical gear, and the number of teeth of said spur gear is smaller than the number of teeth of said helical gear. The shape of said protrusion is a twisted substantially equilateral triangular prism, the comers of said substantially equilateral triangular prism are chamfered, and said protrusion is fitted into said hole of which the cross-section is a substantially equilateral triangle.

Noda et al. in view of Kitamura suggest a process cartridge detachably mountable to a main body of an electrophotographic image forming apparatus for forming an image on a recording medium, the electrophotographic image forming apparatus having a motor, a main body gear for transmitting a driving force of said motor, and a non-circular twisted hole provided in a central portion of said main body gear and rotated with said main body gear, a cross-section of the twisted hole having a plurality of comers, said process cartridge comprising: (a) an electrophotographic photosensitive drum having: a. a cylinder having a photosensitive layer on a peripheral surface thereof, and b. a driving-force transmitting part mounted on one end of said cylinder and having a spur gear for transmitting a driving force received from said main body of

Serial Number: 09/965802

Art Unit: 2852

the apparatus to a transfer roller provided in said main body of the apparatus when said process cartridge is mounted to said main body of the apparatus, a helical gear provided in juxtaposed relationship with said spur gear for transmitting the driving force received from said main body of the apparatus to a developing roller provided in said process cartridge when said process cartridge is mounted to said main body of the apparatus, a shaft portion provided in juxtaposed relationship with said helical gear, and rotatably supported by a bearing portion when said photosensitive drum is mounted in said process cartridge, and a non-circular twisted protrusion to be fitted into said hole when said process cartridge is mounted to said main body of the apparatus to receive the transmission of the driving force from said main body of the apparatus and of which the cross-section has a plurality of comers, wherein when said photosensitive drum is mounted in said process cartridge in the axial direction thereof, said shaft has an area overlapping an area in which said helical gear is provided, and transmits the driving force received from said main body of the apparatus to said cylinder through said helical gear and said spur gear, and transmits the driving force to said developing roller through said helical gear, and transmits the driving force to said transfer roller through said spur gear; and (b) said developing roller for developing an electrostatic latent image formed on said photosensitive drum.

The process cartridge further comprising an earth member for grounding said photosensitive drum to said main body of the apparatus when said process cartridge is mounted to said main body of the apparatus, said earth member being provided at the center of said driving-force transmitting part through the same in said axial direction. The driving-force

Serial Number: 09/965802

Art Unit: 2852

transmitting part is one united body made of resin into which a fitted portion fitted to one end of said cylinder, said spur gear, said helical gear and said protrusion are formed integrally. The tooth width of said spur gear is narrower than the tooth width of said helical gear, and the number of teeth of said spur gear is smaller than the number of teeth of said helical gear. The shape of said protrusion is a twisted substantially equilateral triangular prism, the comers of said substantially equilateral triangular prism are chamfered, and said protrusion is fitted in said hole of which the cross-section is a substantially equilateral triangle.

Noda et al. In view of Kitamura suggest a driving-force transmitting part for use in a process cartridge detachably mountable to a main body of an electrophotographic image forming apparatus for forming an image on a recording medium, the electrophotographic image forming apparatus having a motor, a main body gear for transmitting a driving force of said motor, and a non-circular twisted hole formed in the central portion of said main body gear and rotated with said main body gear, a cross-section of the twisted hole having a plurality of comers, said driving-force transmitting part comprising: a fitted portion to be fitted to a cylinder of an electrophotographic photosensitive drum in order to be mounted on one end of said cylinder; a spur gear for transmitting a driving force received from said main body of the apparatus to a transfer roller provided in said main body of the apparatus when said process cartridge is mounted to said main body of the apparatus; a helical gear provided in juxtaposed relationship with said spur gear for transmitting the driving force received from said main body of the apparatus to a developing roller provided in said process cartridge when said process cartridge is

Serial Number: 09/965802
Art Unit: 2852

mounted to said main body of the apparatus; a shaft portion provided in juxtaposed relationship with said helical gear, and rotatably supported by a bearing portion when said photosensitive drum is mounted in said process cartridge; and a non-circular twisted protrusion to be fitted into said hole to receive the transmission of the driving force from said main body of the apparatus and of which the cross-section has a plurality of comers, wherein when said photosensitive drum is mounted in said process cartridge in an axial direction thereof, said shaft portion has an area overlapping an area in which said helical gear is provided, and transmits the driving force received from said main body of the apparatus through said hole and said protrusion to said cylinder through said helical gear and said spur gear, and transmits the driving force to said developing roller through said helical gear, and transmits the driving force to said transfer roller through said spur gear.

Noda et al. in view of Kitamura suggest a driving-force transmitting part wherein on the end surface of said helical gear, a circular recess is provided on a line coaxial with said axis, and said bearing portion slides with the outer peripheral surface of said shaft portion and the inner peripheral surface of said recess which is continuous from said outer peripheral surface, and rotatably supports said shaft portion and said recess. The driving-force transmitting part further comprising an earth member for grounding said photosensitive drum to said main body of the apparatus when said process cartridge is mounted to said main body of the apparatus, said earth member being provided at the center of said driving-force transmitting part through the same in said axial direction. The driving-force transmitting part is one united body made of resin into

Serial Number: 09/965802

Art Unit: 2852

which the fitted portion to be fitted to one end of said cylinder, said spur gear, said helical gear and said protrusion are formed integrally. The tooth width of said spur gear is narrower than the tooth width of said helical gear, and the number of teeth of said spur gear is smaller than the number of teeth of said helical gear. The shape of said protrusion is a twisted substantially equilateral triangular prism, the comers of said substantially equilateral triangular prism are chamfered, and said protrusion is fitted in said hole of which the cross-section is a substantially equilateral triangle.

Noda et al. in view of Kitamura suggest an electrophotographic image forming apparatus to which a process cartridge is detachably mountable for forming an image on a recording medium, comprising: (a) a motor; (b) a main body gear for transmitting a driving force of said motor; (c) a non-circular twisted hole provided in a central portion of said main body gear and rotated with said main body gear, a cross-section of said twisted hole having a plurality of comers; (d) a transfer roller for transferring a developed image formed on said electrophotographic photosensitive drum to said recording medium; and (e) a mounting portion for detachably mounting the process cartridge, the process cartridge having: (f) an electrophotographic photosensitive drum including: a. a cylinder having a photosensitive layer on a peripheral surface thereof, b. a driving-force transmitting part mounted on one end of said cylinder, and the driving-force transmitting part having a spur gear for transmitting a driving force received from the main body of said apparatus to said transfer roller when said process cartridge is mounted to said main body of the apparatus, a helical gear provided in juxtaposed

Serial Number: 09/965802

Art Unit: 2852

relationship with said spur gear for transmitting the driving force received from said main body of the apparatus to a developing roller provided in said process cartridge when said process cartridge is mounted to said main body of the apparatus, a shaft portion provided in juxtaposed relationship with said helical gear, and rotatably supported by a bearing portion when said photosensitive drum is mounted in said process cartridge, and a non-circular twisted protrusion fitted into said hole to receive the transmission of the driving force from said main body of the apparatus when said process cartridge is mounted to said main body of the apparatus, and of which the cross-section has a plurality of comers, wherein when said photosensitive drum is mounted in said process cartridge in the axial direction thereof, said shaft portion has an area overlapping an area in which said helical gear is provided, and transmits the driving force received from said main body of the apparatus through said hole and said protrusion to said cylinder through said helical gear and said spur gear, and transmits the driving force to said developing roller through said helical gear, and transmits the driving force to said transfer roller through said spur gear; and (ii) said developing roller for developing an electrostatic latent image formed on said photosensitive drum. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teaching of Kitamura with the image forming device of Noda et al. to obtain an image forming device where the respective rollers are rotated without fluctuations (Kitamura; column 4, lines 1-4).

Response to Amendment

3. Applicant arguments are persuasive and a new rejected is included above.

Serial Number: 09/965802
Art Unit: 2852

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quana Grainger whose telephone number is 703-308-7616. The examiner can normally be reached on weekdays between the hours of 9-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Arthur Grimley can be reached on 703-308-1373. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.



Quana Grainger
Primary Examiner
Art Unit 2852

QG
May 19, 2003